WHAT IS CLAIMED IS:

1. A method for determining channel estimates at a receiver for a wireless communication system using orthogonal frequency division multiplexing (OFDM) over a plurality of OFDM subcarriers, the method comprising:

receiving training signals from one or more receive antennas;

computing an estimated channel impulse response from the received training signals by reference to a training sequence; and

adaptively truncating the estimated channel impulse response in the time domain to improve the signal-to-noise ratio of the channel estimates.

2. The method of claim 1, wherein computing the estimated channel impulse response includes:

transforming time-domain samples of the training signals to subcarrier coefficients for each of the plurality of OFDM subcarriers;

converting the subcarrier coefficients to impulse coefficients using a training sequence; and

transforming the impulse coefficients to obtain the channel impulse response estimate in the time domain.

3. The method of claim 2, wherein the training sequence includes a zero component for a DC one of the plurality of OFDM subcarriers, and wherein converting the subcarrier coefficients to impulse coefficients includes interpolating the impulse coefficients for the OFDM subcarriers other than the DC subcarrier, thereby supplying an impulse coefficient at DC.

4. The method of claim 2, wherein the training sequence includes a zero component for a DC one of the plurality of OFDM subcarriers, the method further comprising:

subsequently to transforming the impulse coefficients to obtain the channel impulse response estimate in the time domain, estimating a DC offset from a plurality of samples near the tail of the time domain channel impulse response estimate; and

correcting the time domain channel impulse response estimate for the estimated DC offset.

5. The method of claim 1, wherein adaptively truncating the estimated channel impulse response includes:

computing a channel power function representing power received near a sample time;

estimating channel noise;

computing a cutoff time based on the channel power function and the channel noise estimate;

truncating the time domain channel impulse response estimate at the cutoff time; and

transforming the truncated time domain channel impulse response estimate to a frequency domain channel estimate.

6. The method of claim 5, wherein the channel power function is given by:

$$P_h[t] = \sum_{i=0}^{i_0} \sum_{n=0}^{M_r - 1} \left| \hat{h}_n^0[(i+t) \bmod N] \right|^2 \text{, where:}$$

t is a time parameter measured in samples;

M_r is the number of receive antennas;

$\hat{h}_{n0}[i]$ is the time domain channel impulse response estimate;

N is the number of samples in a symbol period of the training sequence; and

i_0 is a filtering time.

7. The method of claim 6, wherein the channel noise is estimated by minimizing $P_h[t]$ over the time parameter t.

8. The method of claim 5, wherein truncating the time domain channel impulse response estimates includes applying a windowing function around the cutoff time.

9. The method of claim 5, wherein truncating the time domain channel impulse response estimate includes applying a timing correction determined from the channel power function.

10. The method of claim 9, wherein the timing correction is given by $\tau' = \arg\max_{t} P_h[t]$, , where $P_h[t]$ is the channel power function and the maximization is performed over all values of time parameter t.

11. The method of claim 10, wherein applying the timing correction includes cyclically shifting each of the time domain channel response estimate and the power function by τ' samples.

12. The method of claim 1, wherein the reciever is configured to receive packets complying with IEEE 802.11a.

13. The method of claim 1, wherein the receiver includes a plurality of receive antennas and wherein the steps of receiving, computing, and adaptively truncating are performed for each of the receive antennas.

14. A method of channel estimation for a receiver of a multiple input, multiple output (MIMO) communication system wherein signals are transmitted using orthogonal frequency division multiplexing (OFDM) over a plurality of OFDM subcarriers, the method comprising:

receiving, at each of a plurality of receive antennas, training signals from a plurality of transmit antennas, wherein the signal from each transmit antenna includes a different subset of the plurality of OFDM subcarriers;

transforming the received training signals at each receive antenna to a plurality of impulse coefficients for that receive antenna, each impulse coefficient corresponding to a different one of the OFDM subcarriers; and

for each of the receive antennas, computing a channel impulse response for one of the transmit antennas using the impulse coefficients for the subset of the OFDM subcarriers transmitted by the one of the transmit antennas.

15. The method of claim 14, wherein computing a channel impulse response for one of the transmit antennas includes:

transforming time-domain samples of the training signals to subcarrier coefficients for each of the plurality of OFDM subcarriers;

converting the subcarrier coefficients to impulse coefficients using a training sequence; and

transforming the impulse coefficients to a channel impulse response estimate in the time domain.

16. The method of claim 15, wherein the training sequence includes a zero component for a DC one of the plurality of OFDM subcarriers, and wherein converting the subcarrier coefficients to impulse coefficients includes interpolating the impulse coefficients for the OFDM subcarriers other than the DC subcarrier, thereby supplying an impulse coefficient at DC.

17. The method of claim 15, wherein the training sequence includes a zero component for a DC one of the plurality of OFDM subcarriers, the method further comprising:

subsequently to transforming the impulse coefficients to obtain the channel impulse response estimate in the time domain, estimating a DC offset from a plurality of samples near the tail of the time domain channel impulse response estimate; and

correcting the time domain channel impulse response estimate for the estimated DC offset.

18. The method of claim 15, wherein computing a channel impulse response for one of the transmit antennas further includes adaptively truncating the time domain channel impulse response estimate to improve the signal-to-noise ratio of the channel estimates.

19. The method of claim 18, wherein adaptively truncating the time domain channel impulse response estimate includes:

computing a channel power function representing power received near a sample time;

estimating channel noise;

computing a cutoff time based on the channel power function and the channel noise estimate;

truncating the time domain channel impulse response estimate at the cutoff time; and

transforming the truncated time domain channel impulse response estimate to a frequency domain channel estimate.

20. The method of claim 19, wherein the channel power function is given by:

$$P_h[t] = \sum_{i=0}^{i_0} \sum_{n=0}^{M_r-1} \sum_{m=0}^{M_t-1} \left| \hat{h}^{0}_{nm}[(i+t) \bmod N] \right|^2 \text{, where:}$$

t is a time parameter measured in samples;

M_r is the number of receive antennas;

M_t is the number of transmit antennas;

$\hat{h}_{n0}[i]$ is the time domain channel impulse response estimate;

N is the number of subcarriers transmitted by one transmit antenna during the training sequence; and

i_0 is a filtering time.

21. The method of claim 20, wherein the channel noise is estimated by minimizing $P_h[t]$ over the time parameter t.

22. The method of claim 19, wherein truncating the time domain channel impulse response estimate includes applying a timing correction determined from the channel power function.

23. The method of claim 22, wherein the timing correction is given by $\tau' = \arg\max_t P_h[t]$,, where $P_h[t]$ is the channel power function and the maximization is performed over all values of time parameter t.

24. The method of claim 23, wherein applying the timing correction includes cyclically shifting each of the time domain channel response estimate and the power function by τ' samples.

25. A method of tracking channel variations during receipt of a packet using one or more receive antennas, comprising:

determining an initial channel estimate from training data included in the packet;

identifying a received symbol in the packet;

estimating an input symbol value using the received symbol value and the initial channel estimate;

deriving a per-symbol channel estimate from the received symbol value and the estimated input symbol value; and

updating the initial channel estimate using the per-symbol channel estimate.

26. The method of claim 25, wherein updating the initial channel estimate includes applying a first order filter to the initial channel estimate and the per-symbol channel estimate.

27. The method of claim 25, wherein the packet is transmitted using a plurality of transmit antennas and received using a plurality of receive antennas, and wherein channel estimates are derived as a matrix for respective channels between each of the transmit antennas and each of the receive antennas.

28. The method of claim 25, wherein the packet is transmitted using orthogonal frequency division multiplexing (OFDM) over a plurality of OFDM subcarriers and wherein channel variations are tracked for each of the OFDM subcarriers.